DIRECT AND INVERSE PROPORTION

Answer all of these questions. Remember to show your working out in all questions.

MAIN QUESTIONS

1. $y \propto x$, when $x = 4$, $y = 12$. Find y when $x = 7$

2. $y \propto x$, when $x = 5$, $y = 15$. Find y when $x = 8$

3. $y \propto x^2$, when $x = 3$, $y = 18$. Find y when $x = 5$

4. $y \propto x^2$, when $x = 2$, $y = 12$. Find y when $x = 4$

5. $y \propto \sqrt{x}$, when $x = 16$, $y = 8$. Find y when $x = 25$

6. $y \propto \sqrt{x}$, when $x = 9$, $y = 6$. Find y when $x = 36$

7. $y \propto 1/x$, when $x = 4$, $y = 3$. Find y when $x = 6$

8. $y \propto 1/x$, when $x = 5$, $y = 4$. Find y when $x = 10$

9. $y \propto 1/x^2$, when $x = 2$, $y = 3$. Find y when $x = 4$

10. $y \propto 1/x^2$, when $x = 3$, $y = 2$. Find y when $x = 6$

11. $y \propto x^3$, when $x = 2$, $y = 16$. Find y when $x = 3$

12. $y \propto x^3$, when $x = 1$, $y = 5$. Find y when $x = 4$

13. $y \propto 1/\sqrt{x}$, when $x = 16$, $y = 2$. Find y when $x = 4$

14. $y \propto 1/\sqrt{x}$, when $x = 25$, $y = 1$. Find y when $x = 9$

15. $y \propto x$ and $z \propto y$, when $x = 3$, $y = 6$, $z = 18$. Find z when $x = 5$

16. $y \propto x$ and $z \propto y$, when $x = 2$, $y = 4$, $z = 12$. Find z when $x = 6$

17. $y \propto x^2$ and $z \propto y$, when $x = 2$, $y = 8$, $z = 24$. Find z when $x = 3$

18. $y \propto x^2$ and $z \propto y$, when $x = 1$, $y = 3$, $z = 9$. Find z when $x = 4$

19. $y \propto x$ and $z \propto 1/y$, when $x = 4$, $y = 8$, $z = 3$. Find z when $x = 6$

20. $y \propto x$ and $z \propto 1/y$, when $x = 5$, $y = 10$, $z = 2$. Find z when $x = 8$

23. $y \propto \sqrt{x}$ and $z \propto y^2$, when $x = 9$, $y = 6$, $z = 72$. Find z when $x = 16$

24. $y \propto \sqrt{x}$ and $z \propto y^2$, when $x = 4$, $y = 4$, $z = 32$. Find z when $x = 25$

25. $y \propto 1/x$ and $z \propto y^2$, when $x = 2$, $y = 5$, $z = 50$. Find z when $x = 5$

26. $y \propto 1/x$ and $z \propto y^2$, when $x = 4$, $y = 3$, $z = 27$. Find z when $x = 6$

27. $y \propto x^3$ and $z \propto 1/y$, when $x = 1$, $y = 2$, $z = 4$. Find z when $x = 2$

28. $y \propto x^3$ and $z \propto 1/y$, when $x = 2$, $y = 16$, $z = 1$. Find z when $x = 4$

29. $y \propto 1/\sqrt{x}$ and $z \propto y^3$, when $x = 16$, $y = 2$, $z = 16$. Find z when $x = 4$

30. $y \propto 1/\sqrt{x}$ and $z \propto y^3$, when $x = 25$, $y = 1$, $z = 1$. Find z when $x = 9$

MASTER QUESTIONS

M1. The cost of printing invitations is directly proportional to the number printed. If 100 invitations cost £25, how much would 350 invitations cost?

M2. The time taken to fill a swimming pool is inversely proportional to the number of hoses used. With 3 hoses, it takes 8 hours. How long would it take with 5 hoses?

M3. The intensity of light from a bulb is inversely proportional to the square of the distance from the bulb. At 2 metres, the intensity is 80 lux. What is the intensity at 5 metres?

M4. The distance a car travels varies directly with the amount of fuel used. If the car travels 240 miles on 12 litres of fuel, how far can it travel on 18 litres?

M5. The number of people needed to complete a task is inversely proportional to the time taken. If 6 people take 10 days, how many people are needed to complete it in 4 days?

M6. The volume of a gas varies inversely with pressure at constant temperature. If a gas has volume $600cm^3$ at pressure 100kPa, what is its volume at 150kPa?

M7. The area of a circle varies directly with the square of its radius. If a circle with radius 3cm has area $28.27cm^2$, what is the area of a circle with radius 7cm?

M8.

The time taken for a pendulum to swing varies directly with the square root of its length. If a 1m pendulum takes 2 seconds, how long does a 2.25m pendulum take?

M9.

The gravitational force between two objects varies inversely with the square of the distance between them. If the force is 180N at 2m, what is the force at 6m?

M10.

The current in an electrical circuit varies inversely with the resistance. If the current is 4A when resistance is 15Ω, what is the current when resistance is 20Ω?